ALLIED COMMAND TRANSFORMATION

STRATEGIC FORESIGHT ANALYSIS WORKSHOP

INTEGRATING COMPUTING POWER TO THE SFA PROCESS AND AN INITIAL DISCUSSION ON REGIONAL PERSPECTIVES

CADIZ, SPAIN
APRIL 24 -25

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david.sherriff@act.nato.int or Isabel.guerra@act.nato.int.

ANNEX A TO
5000/TSC-PAX-0010/TT-180579/Ser:NU0348
DATED 23 MAY 2018

Strategic Foresight Analysis (SFA) Workshop Report
24-25 April 2018
Cadiz, Spain

1. Background:

1.1 The Strategic Foresight Analysis (SFA) 2017 Report was approved in October 2017 and it was introduced to the wider public with two launch events: Washington D.C. on 16 Nov 2017 and the Berlin Security Conference on 28 November 2017. The success of the SFA 2017 Report, like its predecessors, the SFA 2013 and 2015 Update Reports, is a result of contributions provided by Nations, NATO Commands and Agencies, NATO COEs, academia, industry and think tank representatives. The SFA 2017 Report can be reached via the following links.
http://www.act.nato.int/images/stories/media/doclibrary/171004_sfa_2017_report_hr.pdf
http://www.act.nato.int/futures-work

1.2 The SFA Workshop in Cadiz was an initial attempt to share our ideas and objectives for the 2018 and 2019 timeframe with our SFA community of interest. In the next two years, the convergence of the technology trends and their implications on all other trends in the political, human, economy/resources and environment domains will be analysed and a test report, using computing power in the analysis process, will be developed. Additionally, short regional reports on Russia-Eastern Europe, the Arctic, Asia-Pacific and the Middle East and North Africa and the Sahel will be provided as an outcome of regional workshops. In this work, computing power will be used to support the research and analysis phases, development of scenarios to validate and inform trend analysis, and identification of implications. This process will provide an example of using technology and innovative approaches in staff processes, and of testing new ground to make an end product that adds value to NATO and Nations.

1.3 The aim of the SFA workshop was to take stock, review methodology, discuss best practices and to outline a proposed way ahead toward the development of future Reports, while maintaining collaboration with NATO and Partner Nations, NATO Command and Agencies, Centres of Excellence, academia and industry. In this regard the WS was divided into three parts:
PART – 1: SFA overview, best practices and using computing power to support methodology
PART – 2: Confluence of Technology Trends and their implications on trends/domains
PART – 3: Regional Perspectives

2. SFA Workshop Cadiz, Spain - Participants:

Attendees	
ACT (including SEE & STRE)	16
ACO	1
NATO HQ	2
14 COEs	15
25 Nationalities	63
Total	97

Member Nations	BEL, BGR, CAN, CZE, DEU, DNK, ESP, FRA, GBR, HUN, ITA, LTU, NLD, NOR, POL, ROU, SLO, SVK, TUR, USA
Partner Nations	AUS, AUT, CHE, FIN, SWE
COEs	C2, CJOS, CSW, DAT, ENSEC, EOD, HUMINT, JAPCC, JCBRN, MILENG, MP, M&S, MW, SP
Academia/Industry	4Strat, Armasuisse Science & Technology, Austrian Institute of Technology, Czech Defence University, IBM, Leonardo, Kindred Spirits, Norwegian Institute for Defence Studies, Canadian Defence Research and Development Centre, Swedish Defence Research Agency, UK Development, Concepts and Doctrine Centre (DCDC), UK DSTL, European Defence Agency, US Joint Staff J7, French CICDE, and German Planning Office.

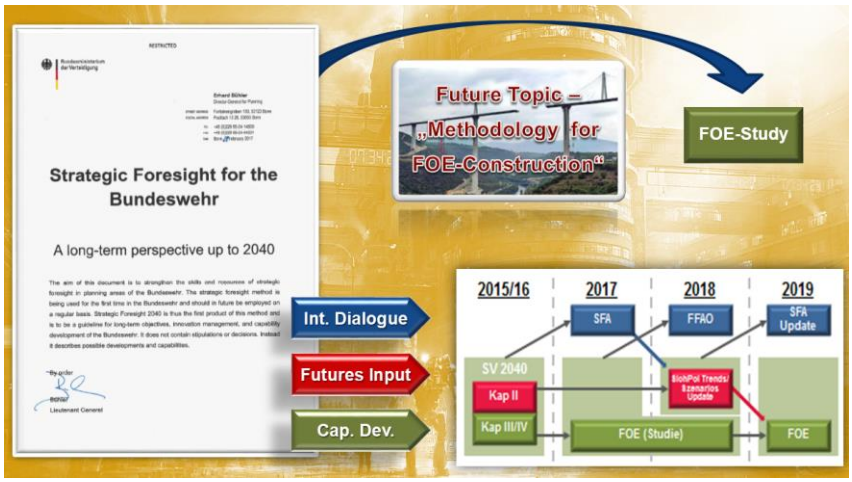
3. **Foundational documents:** The SFA 2017 Reports, and the best practices on methodology provided by the Development, Concepts and Doctrine Centre (DCDC), the German Planning Office and the US J7, as well as SME presentations on regional perspectives were used as the basis for the discussions.

4. Workshop Findings:

4.1 **Part – 1: National presentations on best practices in methodology and industry presentations on including computing power in the SFA process:**

- **German Planning Office:** Dr Olaf Theiler introduced the methodology and practices used by the Future Analysis Branch in development of the Scenario Work in and for the German Armed Forces. He argued that there is a need for a paradigm shift from probability to possibility. While there is no way to predict the future, there are many possibilities that can be prepared for increasingly complex and vague situations. Working with multiple futures, scenario thinking and an increased understanding of potential black swan events allows decision makers to be ready for unpredictable conditions. In accordance with their concept, trend analysis provides a look forward to the future, while scenario analysis enables back-casting from the future to today. He also argued that scenarios:
  - mirror existing expectations,
  - highlight uncertainties and decisive points,
  - contribute to clarity in thinking about the future, and,
  - provide a venue for 'out of the box thinking'.

He cautioned that they do not consider scenarios as predictions and do not expect the future will look exactly like any scenarios. He also explained how they take into consideration and study wild cards, black swans etc. In conclusion, he provided an overview of the capability development process starting with how trend analysis, the future security environment, future conflict pictures, and the wild cards/black swans support implications for further research and analysis that feeds into the capability development process. Their work is developed in close collaboration with NATO (SFA & FFAO) and some other National future studies.



- **UK Development, Concepts and Doctrine Centre (DCDC):** LTCOL Ken Martin gave an overview of DCDC's Strategic Trends Programme, their methodology and the way ahead for the Strategic Analysis Programme. DCDC acts as the UK MOD's think tank by providing future concepts, doctrine, oversight of the legal content of operational law training, and by supporting the development of strategy. DCDC has increasingly become multinational, including staff officers from Sweden, Australia, Finland, France and Germany. The Strategic Trends Programme provides strategic context for planning and decision support. It is an aid to thinking about the future out to 30 years. DCDC's principal method is to identify robust trends and project these forward. DCDC's products include Global Strategic Trends (GST), Future Operating Environment (FOE) and Regional Surveys. GST 6 work-strands cover 30 'Thematic' areas such as environment (including climate change), resources, materials and waste, food & water, energy, demography (ethnicity, migration & ageing), the human habitat, the built environment (where we will live), globalization & its impacts and the human race (health and augmentation), etc. and 12 'Geographic' areas such as the Indo-Pacific (including Oceania), Central Asia, the Middle East, the High North (including the Arctic), Africa, Europe, Russia, etc. A GST 6 Implications workshop will take place on 30 May 2018 and the expected launch for GST 6 is scheduled for Sep 2018.

- **The US Joint Staff J-7:** Mr. Jeff Becker provided a briefing on their recent paper: *"Challenged Assumptions and Potential Groupthink: Observations and Insights from International Deep Futures Collaboration."*[1] This study was inspired by the ACT-led International Concept Development and Experimentation (ICD&E) Conference 2017 that focused on better understanding military change across our alliances and partnerships over the next two decades. Taking into account the changing character of war and the requirement to work together, the paper examines both common assumptions and differences among NATO members. The study begins with challenged assumptions - those areas in which the U.S. view of an issue appears to be somewhat different from the way NATO Allies and partners might see it. For example, the US assumption that '*relative U.S. strategic and military power will be static or only experiencing slight decline'* is different to the assumptions of some of the Allies. There are other areas that are analysed in a similar way:
  - Increased potential for globalization to slow…or even reverse.
  - Increased risk of large-scale great power conflict.
  - Improved ability to detect and attribute malign activities and attacks.
  - High probability of WMD proliferation.
  - Cyberspace as a domain of future operational and tactical level warfare.
  - Climate change is largely irrelevant for future (military) force design.
  - Rapid emergence and high impact of hypersonic and directed energy weapons.

  The second part of the study describes the following 10 areas of potential 'groupthink' where the views of all nations appear very similar and may merit further examination.
  - 'Developed economies will lose ground to the developing world…'
  - 'Adversaries will reach technological parity with the West…'
  - 'Growth of loosely controlled, highly connected information technologies…'
  - 'Non-state actors will be more effective and deadly…'
  - 'Population growth and inequality will drive persistent migration to the West indefinitely…'
  - 'More failed and failing states will fragment and collapse…'
  - 'Urbanization will accelerate and increase conflict in cities…'
  - 'Information will be as important as physical actions in warfare…'
  - 'Militaries will field more numerous and effective robotic and autonomous systems…'
  - 'Peace' and 'war' are on a continuum of activity with ill-defined boundaries…'

- **Industry:** IBM's Artificial Intelligence Partnerships Program Director, Mr. Michael Perrone and 4Strat's representative Mr. Christian Sprengel provided presentations on how their programmes could support the SFA process. They provided demonstrations during lunch breaks.

4.2. Part – 2: Confluence of Technology Trends and their implications on trends/domains:

4.2.1. <u>Technology's influence on political trends:</u>

- **The redistribution of geostrategic power:**

  Baseline:
  - China will continue to invest in artificial intelligence (A.I.), bioengineering, nano-engineering, quantum technologies, and is likely to deny the West access to its technologies.
  - Development of advanced weaponry by Russia will affect the balance of power.
  - Strategic rivalry between great powers will affect global leadership and impact strategic space for smaller nations.
  - Western countries are more restricted legally and ethically in the development of A.I. and other technologies.
  - Democratization of technologies, non-state actors can gain partial advantage over state actors.
  - Google, Apple, Facebook, Amazon (GAFA) and other large corporations' influence on global power distribution is likely to increase.

[1] The views expressed in this paper are based Mr Jeff Becker's own research and analysis and do not reflect views of the US DoD and Joint Staff.

Key Takeaways – projections out to 2040:
- NATO Nations should continue to increase situational awareness predictive technologies.
- Competition to maintain the technological edge will be more-fierce and is expected to continue out to 2040 and beyond, increasing the potential for conflict.

Implications:
- Technological developments will change NATO's ability to project power.
- The West's ability to uphold its regulations against the pace of technology development will be a challenge.

- **Use of power politics:**

Baseline:
- China has been moving from imitation to innovation rapidly and its investment in R&D is expected to surpass the U.S. in overall spending by 2020.
- As the United States and China look to protect their national security needs and economic interests, the fight between the two economic superpowers is increasingly focused on a single area: technology.
- The evolving technology dynamic between China and the west will probably involve a mix of envy, competition – and perhaps confrontation.
- China also has an ambitious space programme. It intends to have a completely assembled space station in 2022 and has targeted a moon landing by 2036.
- Russia has been heavily funding and modernizing its ageing armed forces and continues to expand its arsenal of long-range cruise missiles and other precision-guided munitions.
- Russia has successfully integrated information operations, cyber, political influence, and economic coercion as part of its hybrid warfare tool box to operate in the grey zone.

Key Takeaways – projections out to 2040:
- Technological developments will change the way military power is employed.
- Economic estimates indicate that China might be able to field a larger and less expensive military than the U.S. by as early as the 2030s.
- Technology competition, especially in artificial intelligence, will be crucial for global power.

Implications:
- Peer competitors will increasingly use disruptive technologies in the future.
- NATO needs to adapt to be able to compete in the grey zone.

- **Non-state actor influence in domestic and international affairs:**

Baseline:
- Private security actors' role in providing security is likely to increase.
- Terrorists and non-benign state actors will benefit from the proliferation of advanced technologies including WMD, bio/nanotechnologies, machine learning, A.I., etc.
- The requirement for the protection of civilians in war zones will increase.
- In a European conflict, states might not outsource security to PMSCs.
- The future of global organized crime will present more challenges as criminals use advanced technology and crypto-communications.

Key Takeaways – projections out to 2040:
- NATO needs to increase and improve cooperation with IOs and NGOs in certain cases to facilitate interaction.
- Non-state actors are constantly morphing through decentralized technology development and communication.
- Governments' role will decrease and shift to non-state actors. States may lose their monopoly over the use of force.

Implications:
- Lone wolf attacks using advanced technology may increase and impacts could reach catastrophic level.
- NATO needs to identify whether NGOs are friendly or have malicious intent.

- Governments' ability to control/work together with NGOs will be challenged as NGOs become more agile and smaller in size.

- **Challenges to Governance:**
  Baseline:
  - China is duplicating global governance structures and setting its own rules, especially in economic structures.
  - Political global governance structures are even being questioned by western countries, e.g. weakening U.S. support to U.N. or UNHCR.
  - Overestimation of global political governance structures leading to higher expectations than they are capable of delivering.
  - China/Russia relations depend on their relations with the U.S. and EU.
  - Russia could use technology to address its challenges in different areas and use as a strategic deterrent.

  Key Takeaways – projections out to 2040:
  - Decentralized technology could help development in Africa and MENA.
  - Technology should fit into social, cultural context and existing infrastructure in developing countries.
  - Technology may not provide a significant difference in projecting stability, however, it has the potential to empower individuals and improve democratic institutions.

  Implications:
  - Technology will make political structures more fragile initially, however, they may later become more robust due to increased accountability.
  - Governments needs to find a healthy balance between protecting the country and granting individual privacy.

- **Public discontent/disaffection and polarization:**
  Baseline:
  - Technology is neutral. How it is used is what matters.
  - Regulation of technology use will determine whether it is going to increase polarization.
  - Access to technology will increase the generational divide.
  - Technology could lead to public discontent and fractured societies however it could ease public discontent by enabling public services for public benefit.
  - Technology may have unexpected second and third order effects such as causing unemployment that may lead to an increase in polarization.
  - Social media will reduce trust between governments/institutions and the people.

  Key Takeaways – projections out to 2040:
  - Technology may lead to unequal participation on education, politics, wealth, employment, social security and may result in a winner takes all result.
  - Technology regulation needs to keep up with the pace of technological development.

  Implications:
  - Decision-makers need to identify how much regulation is required.
  - Technology allows fragmentation of societies.

4.2.2. <u>Technology's influence on human trends:</u>

- **Asymmetric demographic change:**
  Baseline:
  - The use of Clustered Regularly-Interspaced Short Palindromic Repeats (CRISPR) CRISPR-Associated Systems (CAS9) technology might be widely available and used by various nations to various degrees.
  - New technologies will enable tailored genetic modification of crops and more energy-efficient water purification. This will allow much bigger populations to be supported with water and food from the same amount of land.
  - Life extension techniques increasing lifespan, but not necessarily better health, will create an increased burden on social and healthcare systems.

Key Takeaways – projections out to 2040:

- Genetic editing and modification, even if cheap and widely available, have the possibility to widen the gap between the have and have nots, thus creating parallel, multi-tier societies.
- Rapid technological development in the field of automatization will have a big influence in work-life balance and income.
- There will be a large variation in how nations/cultures/ethical bases/income brackets will use and deal with tech integration.

Implications:

- Who are going to be the first nations to use gene editing?
- Tailored genetic modification is further increasing the fractures between the have and have nots.
- Ethics, law and responsibility have to be paired with technological innovation.
- Automatization will cause unemployment and loss of income to families.
- 2nd/ 3rd order consequences of rapid adoption of technologies are almost more consequential than the disruptive impact of technologies themselves.

- **Increasing urbanization:**

Baseline:

- Emerging technologies will change the way cities look and work.
- "Smart Cities" will be more vulnerable to cyber-attacks and decrease privacy even more.
- A mega-city in the future is going to be a mix of smart, not so smart, and feral parts.
- Alternate economies (bitcoin etc.) will change how commerce is done in cities.
- Automated transport and the integration of smart cars will probably be seen in the next few years.
- Resource disruptors like space-based solar energy, vertical farming, and evaporation water sources will dramatically change the way that cities function and will make them more self-sufficient.

Key Takeaways – projections out to 2040:

- Alternate economies and automatization will cause labour disruption in cities.
- The distribution of supplies will be increasingly complex and vulnerable to disruptions.
- Is the new urban area an Achilles heel or force multiplier for the military?
- A higher population density will be more susceptible to pandemics.

Implications:

- People might have more allegiance to the city or corporation/NGO that provides their basic services than to the national government.

- **Fractured and/or polarized societies:**

Baseline:

- We will likely continue to see the evolution of "Digital companions" (cellphones) and alternate reality.
- Universal language translators (human communication with speech) will be widely available and used.

Key Takeaways – projections out to 2040:

- Universal language translators will either make us like each other more, or on the other hand, further cause fraction within society.
- Global vs. local life – not all the population will be interconnected because of technical reasons or because they simply refuse to be interconnected.
- Technology enables but also hinders polarization.
- The digital avatar might blur identity and cause us to lose human connection.
- Certain people might to choose to live their lives through digital avatars.
- Power is being reorganized around new poles.

Implications:

- Extreme fractures in society could lead to civil war.
- Advanced technologies will be used as a tool to entertain and keep the masses in order.
- Protection of identities will be extremely difficult, and dedicated laws will be necessary.

- 2nd/ 3rd order consequences of rapid adoption of technologies are almost more consequential than the disruptive impact of technologies themselves, creating a competition between newly established networks and long established hierarchies, leaving it up to the people to choose their side.

- **Increasingly connected human networks:**
  Baseline:
  - The cyber domain could act as a "primary reality" to escape actual reality.
  - Cellular tech proliferation might lead to a "panopticon world" where everyone can see everything in real time.
  - Cellular tech proliferation might lead to an increased likelihood of interference/ monitoring/ influencing by external actors/ agencies/ governments.
  - The ability to precision target individual humans as a form of intelligence gathering will be widely used by governments and malign entities.
  - Social networks will be an intelligence realm (cyber-HUMINT).
  - China has established the great firewall. This might also be appealing for other nations to control their population.
  - Human-machine fusion and cybernetics will play an important role. The design of a seamless human-machine interface will create totally new forms of human networks.
  - Representative presence, where people have avatars which are physically present for them, will lead to hyper multi-individuality. You can be in multiple locations at the same time in the (different) physical appearance of your choice.

  Key Takeaways – projections out to 2040:
  - Democratic societies will struggle to govern cyberspace.
  - There will be a global competition for influence in connected human networks by governments, MNCs and other entities (good, neutral and bad).
  - There will be a contest to translate cyber knowledge into real world power, limited only by ethical and moral factors.
  - Over-dependence and reliance on technology could reduce our decision making ability.
  - Every individual will be a target to be influenced, and a sensor providing real time information.
  - Individual digital footprints are increasing and can be easily spoofed.

  Implications:
  - There will be severe social and psychological impacts of instantaneous communication.
  - Atomized IT will either increase connectivity or create isolation, depending of the individual's willingness to use it.
  - Vulnerability to violations of OPSEC will very likely make a new set of rules and regulations necessary.
  - Wars might be waged entirely in the cyber domain.

4.2.3. <u>Confluence of technology trends:</u>

- **Rate of Technology advance**
  Baseline:
  - Big tech companies are making software open source (Google, Apple, IBM etc.).
  - Chinese telecom companies are "all in" on AI.
  - Scientists are calling for regulation of CRISPR etc. versus start-ups being free and loose with legal and ethical interpretations and practices (e.g. latest situation with Facebook).
  - Eric Schmidt is calling for government to learn from commercial software development practices.
  - Some legacy systems are too expensive to update.
  - In the commercial world, interoperability is increasing not decreasing.
  - Governmental legal constraints are still in negotiation after decades (e.g. Laser weapons).

  Key Takeaways/Implications:
  - Data is the new gold.
  - Algorithms writing algorithms speed everything up.

- Crowd sourcing as a new exponential driver for technological advance (increased presence of individual researchers and scientists not tied to governments or commercial sectors).
- Rate of advance in the commercial world will be more than exponential (double exponential), but military adoption may be more linear.
- Legal and ethical constraints slow down democracies more than potential adversaries.
- Modularity is the way to insert rapid developments in acquisition.
- If building blocks are available, people will build, no matter what.

- **Access to Technology**

  Baseline:
  - Next Olympics will test for modified genes.
  - DNA screening on pre-born.
  - Small start-ups can enter market segments that were previously exclusive to large industry (e.g. Boom supersonic plane).
  - Access to space has increased: low cost at $1000 per kg and companies opening space assets to the public.
  - China is collecting data on human behaviour for social credit scoring (acceptance in Chinese society to allow for full tracking and reduced privacy for individuals as a requirement for greater security in society).
  - Netflix exploits behavioural data to roll out its service worldwide (the company leveraged the knowledge gained by studying demographics and usages in existing customer countries to roll out 70 Nations at once).

  Key Takeaways/ Implications:
  - Technology enhances access to skills, knowledge and resources (e.g. YouTube videos, crowd funding, etc.).
  - New technology will take off when there is a business case, while old technology will persist in parallel (e.g. 3D printing with hobbyists, criminals, in remote areas, etc.).
  - Data is not geographical, elements of human behaviour are universal others are cultural.
  - Increase in black market for individuals to gain access to data.
  - Potential increase of technological inequality either due to barriers or rejection of technology.
  - Individuals are not subject to government controls (e.g. engineering dog DNA at home).

- **Global Network Development**

  Baseline:
  - Speech and video software already allows real time facial and speech forgery.
  - People are becoming more used to fake news and able to spot it, it is no longer a strategic shock.
  - 5G will deliver in 2022, but China is developing its own “5G” (like GPS-BDS).
  - “Curious noses” distributing 20,000 pollution sensors in Belgium.
  - Internet of Things: the most vulnerable node on the network is your air conditioning/Barbie.
  - Multipurpose assets, for example lamp posts can also charge cars, host networked sensors/cameras or be network base stations.
  - Air deployable self-configuring routers make deployable WIFI networks (military and commercial applications).

  Key Takeaways/ Implications:
  - There is a tendency to think in dystopian terms: technological Mutually Assured Destruction.
  - We’re all relying on the same infrastructure, so disruption is less likely, not more.
  - Fake news will be more convincing, but technology will help identify/counter fake news.
  - If 5G delivers, all personal videos become a potential data source for detecting anomalies e.g. civil unrest, natural disasters.
  - CISCO predicts 200Bn devices on the Internet of Things by 2027.
  - Internet of Things means data and computing power is distributed.

- Global acceptance of surveillance for its benefits: China “safe city”, monitoring elderly, crime prevention.

- **Dominance of the commercial sector in Technological development**
  Baseline:
  - China is investing 30bn USD in AI.
  - China has no clear line between government, commerce and academia whereas the west is divided.
  - Defence sector is competing for available brains. Traditional employment pattern of scientists is changing.
  - Twist Bioscience is storing data in DNA so that we can store data forever at higher density and with lower energy requirements and higher resilience than current tech, but slower access rate.
  - A start-up has crowd funding for destroying favelas and then 3D printing new homes from the waste, and doing the same in outer space (e.g. Moon, Mars).

  Key Takeaways/ Implications:
  - We won’t be able to verify/reverse engineer everything in the software of the future, we already can’t.
  - The Alliance will become more dependent and bound to the commercial sector (also outside the defence commercial sector).
  - Future tech companies will increasingly be transnational entities.

- **Technological dependencies**
  Baseline:
  - Immigration policies may be blocking innovation (second order of government policy effect).
  - Most innovative minds are not in the military or government, they are working for industry (or for themselves).
  - Big companies continue to have an almost religious following.
  - Skills are being lost (e.g. map reading).

  Key Takeaways/ Implications:
  - Dependence on technology in the community affects the regulation from government.
  - The community needs to be resilient.

4.2.4. <u>Technology’s influence on economics/resources trends:</u>

Globalization of financial resources:

Baseline:
- The global financial environment comprises public and private institutions (including the World Bank, IMF, WTO, ADB, AIIB), private equity organizations / lending and financing, and increasingly also empowered individuals (for example the Gates Foundation).Mounting concerns over scale and fragility of international public debt as well as imbalance between public and private capital/wealth.
- Growing awareness of importance of FinTech/Blockchain/Bitcoin/crypto currency innovations; rising concerns over cybercrime, and misuse of financial technology.
- Demographic shift (young versus old) in trust in traditional/legacy financial institutions and arrangements.
- Tensions between short-term gains versus long-term financial benefits and populist disquiet over short-sighted self-seeking financial behaviour.
- Increasing bribery and corruption in NATO operating environments.

Key Takeaways / Implications:
- Revolution in Economic Thinking, Analysis and Policy: overturning of conventional approach to economic growth through the increasing priority given to an environmentally sustainable regenerative sharing and distributive Economy (the "Doughnut Economy")
- The new demographics of the Uber-style economy and commerce and young versus old lifestyle financial arrangements.

- Competition among state and non-state actors for access to, and provision of, financial resources is projected to increase (assisted by technology transfer and demand for infrastructure/micro-financing).

- **Geopolitical dimension of resources:**
  Baseline:
  - Emerging technologies continue to create new energy (battery) storage potential, reduce energy costs and enhance the attractiveness of investment in renewables (wind, solar, etc.).
  - Environmentally sustainable habitats and technologies in support of preservation of natural resources and biodiversity.

  Key Takeaways / Implications:
  - Technology will offer opportunities but power generation remains essential (i.e. in Africa) to support UN MDGs and poverty reduction.

- **Increased inequality:**
  Baseline:
  - Divisive Inequality in and between states; evidence of cross-country and in-country inequality.
  - Migrants, remittances sent to countries of origin and the influence over geopolitical benefits and costs of migration.
  - Differing views on direction of inequality trend (increasing or declining).
  - Technological developments (e.g. improving water supply and medicines) will offer opportunities to improve the situation of the have-nots.
  - Both increasing education and urbanization intensify and mitigate inequality .

  Key Takeaways / Implications:
  - Willingness to share wealth in the economies of the 4th industrial revolution is fundamental to alleviate inequality.
  - Effective and accountable government is the prerequisite for sharing progress equally.

- **Defence expenditures challenged in the West:**
  Baseline:
  - Threat perception determines the willingness to spend on defence and differs among NATO members, but also within societies (see RUSI survey on elites and populists).
  - A resurgent Russia may provoke a new arms race.
  - Rising cost of personnel and technologically advanced equipment are pressurising existing defence budgets.
  - Future wars will start in cyberspace and could even be fought entirely in cyberspace, and therefore may be relatively less costly.

  Key Takeaways / Implications:
  - New technological developments will drive requirements for autonomous and non-autonomous weapons systems with enormous implications for budgetary management and resourcing.
  - Wars in cyberspace may be relatively cheap, but winning wars still requires land, air and sea dominance.

4.2.5. <u>Technology's influence on environment / natural disaster trends:</u>

Baseline:
- A change in climate of +2°C is already certain, regardless of what we do.
- Tackling Climate Change is a challenge as it will require collaborative action and is an intertemporal problem (i.e. action, effort and expense must be made now to produce a result in the future for later generations).
- Environmental stress is increasing – increasing the range of tropical diseases, likelihood of pandemics and decreasing biodiversity. Food and water resources are being increasingly strained.
- Natural disasters (weather –related) are increasing in frequency and intensity, increasingly exposed growing populations, more cascading effects of one disaster impacting and amplifying another.

Key Takeaways/ Implications:

- Geoengineering – potentially helpful, but huge implications over governance, testing, and ability to terminate. Could it be used unilaterally?
- Increased energy efficiency – Some technical solutions to help increase energy efficiency, but largely it is an issue that requires behavioural change. This could be influenced by education, social media, taxation, regulation, new data storage rules, situational awareness.
- Increased use of renewable energy and storage – advances in technology and materials for generation, transmission and storage of electricity, and use of AI for power management, all offer prospect of increased utility from renewables.
- Improved desalination and purification - advanced materials and energy sources will improve ability to make water potable or usable for agriculture and could ease water stress.
- Reduce the use of arable land required to feed meat sources – much of agricultural land is given over to meat production rather than crops. GMO and lab-grown meat could reduce demand for arable land.
- Application of predictive analytics - AI and advanced analytics will give better SA and prediction of natural disasters and their consequences.
- Specialized military units – Some nations already dedicate specialized military units to react to natural disasters within a comprehensive approach. This may be a model for future.
- Increased Arctic operations – increased access to the Arctic will require improved tech support to cope with challenges of communication, navigation and residual ice.
- Sensor performance – Underwater sensors perform differently depending on temp, pressure, salinity etc. Global ocean models to predict performance will be increasingly wrong as the water characteristics change due to ocean warming and glacial melt. They will need to be re-assessed and have new data. Autonomous sensing systems and AI could help with the task. An interconnected system of sensors to monitor the Arctic will be necessary.
- Pandemics – The increased risk of pandemic outbreak could be mitigated by Predictive Analysis, monitoring and Genetic Engineering.

4.3 Part – 3: Regional Perspectives on Russia/Eastern Europe, the Arctic, Asia-Pacific, the Middle East and North Africa & Sahel:

4.3.1 <u>Russia/Eastern Europe:</u>

Dr Flemming Splidsboel Hansen provided a presentation on Russia and Eastern Europe. He highlighted that Russia's GDP is expected to have a steady growth rate by 2035, however, structural reforms will be delayed until they are urgently required. He drew attention to the similarities with today's economic situation by making a reference to Yuriy Andropov's 1983 statement "(i)n the economic sphere the main task is a fundamental increase in labour productivity. We must aim for the highest international levels." According to his analysis, growth will be low to moderate – some gaps will narrow, others will widen. He suggests that by 2035, there will be (at least) one (managed) transition in Russia. Putin is expected to handover presidency to someone he can trust. In this context, the regime will largely manage to preserve stability but change is probable before 2035. There are social reactions to Putin's presidency, the way Russia is managed and restrictions imposed on opposition. Income inequality is another challenge and it is worsening as fossil fuel prices remain low to medium. By 2035, very different and competing processes are expected; overall Russians will be more individualistic and will value higher autonomy, access to information and links to the broader world.

Dr Hansen argued that in the post-Soviet space Russia is still a key, but less so in the future especially in Central Asia and the Caucasus. China will have an increasing influence in those regions as its "one belt one road" project evolves. The post-Soviet space will become increasingly fragmented. The post-Soviet space will still have ties to Russia but these will be weaker, and individual states may have few shared interests. Dr Hansen concluded that:

- Russia and the post-Soviet space will be more fragmented with weak institutional settings and more dissimilar identities.
- Russia will be less stable than today – stability will be challenged under post-Putin or even post-post-Putin regime.

- Russian capabilities will increase relative to the West, decrease relative to emerging powers; major gaps will remain significant.

Baseline:

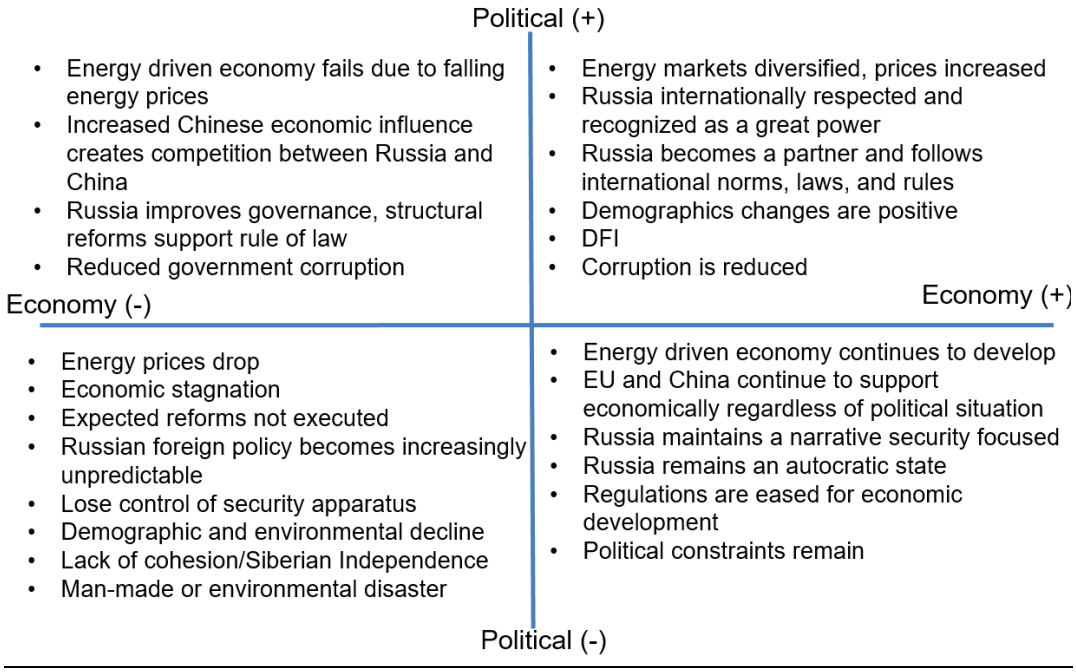
- Russia maintains its strategy to protect its borders.
- Further NATO expansion in Eastern Europe and/or the Caucasus increases Russian sense of insecurity.

Key Takeaways – projections out to 2040:

- Efforts at NATO expansion in Eastern Europe and the Caucasus could trigger conflict.
- Russia wants to maintain/increase influence and be the arbiter for the region – Eastern Europe, the Caucasus, Central Asia.
- Russia could try to exploit Russian speaking populations in the Baltics – particularly Latvia and Estonia.

Implications:

- Russia is at a cross-roads – short-term autocratic or potential long term partner, depending on Russian internal politics and NATO actions/reactions.
- NATO should maintain its deterrence position while keeping doors open for dialogue from a position of strength.
- NATO needs to improve resilience against the Russian hybrid toolbox as Russia tries to find cheap solutions to intervene in NATO countries beneath the Article V threshold.



Key Words, Phrases:

- Energy, cohesion of NATO/EU, demonstrations, instability, credibility of government, cyber-attack, physical attack.
- Obstruction of justice, nationalism, proxy war, anti-democratic process, critical functions of society,
- Critical infrastructure, staged attack on infrastructure, lawfare, discredit western governments, separatism, extremism, and disinformation.
- High North, China, Russia, Canada, USA, Norway, Denmark, Finland, etc.

4.3.2 The Arctic:

- Dr Katarzyna Zysk provided a scene setter for the discussion on the Arctic.
- There are growing and legitimate concerns that the current era of high political stability in the Arctic may be lost. The Ukrainian crisis and illegal annexation of Crimea is one example where tension between Russia and its Arctic neighbours extended to the normally stable Arctic council.
- China has declared itself as a 'Near-Arctic State' and wants to have a 'Polar Silk Road'.

- The geostrategic importance of the Arctic in world politics and the global economy is increasing. This region contains 13% of the world's undiscovered conventional oil and 30% of its undiscovered conventional natural gas, as well as mineral deposits.

Baseline:

- China's interest is increasing (shipping, energy, minerals, political, fishing), making serious commitments.
- Despite ice receding, the operating environment remains challenging most of the year.
- Stable region with a broad web of governance regimes, important from a geopolitical perspective, with globally important energy resources and potentially strategically important sea lines of communication, and some unresolved legal issues.
- Limited shipping in short-term perspective (cost insurance, risk, technological).
- In the long-term, Northern Sea Routes (NSR) have the highest potential to be developed as commercially viable options to Panama and Suez Canals.
- Greenland has been discussing independence for a few years; at stake are riches of mineral resources, including rare earth minerals.
- Resurgence of military presence and activity by several Arctic Nations and the introduction of discussions of NATO Article 5 and how it would apply to the Arctic.
- Safety and security (SAR, disaster relief) inadequate – security challenge.

Key Takeaways – projections out to 2040:

- More international commercial cooperation (Russia, Total, Exxon Mobile) may increase interdependency and common interests, and therefore may be a stabilizing factor for the region.
- More violent weather patterns, more drifting ice, may potentially make operations more challenging.
- Potential technological advances (ships construction, resources extraction, communication, navigation, situational awareness) may facilitate commercial and other human activities.
- Non-Arctic and non-NATO states with interest in maintaining access to the Arctic may complicate conflict scenarios.

<u>Arctic scenarios</u>:

- **Shipping and oil spill disaster**
- Long-term impacts of a ship grounding or of a collision, sending oil into the territorial waters of other nations?
- Potentially disastrous environmental consequences.
- Likely to impede economic development in the region.
- Likely to threaten the way of life of the indigenous population.
- Higher death toll would expose the inadequate SAR and law enforcement capacity in the region.
- What if most of those fatalities are citizens of a country not a full member of the Arctic Council?
- Could it bring nations closer together to work in cooperation to prevent similar future tragedies?
- Or conversely, would another nation use the events as a pretext to fundamentally disrupt the Arctic Council and force a change in Arctic governance? Would the governance be challenged by the most affected nation?
- **Greenland's future**
- Greenland "goes alone" by seeking independence.
- Greenland is aggressively courted by China (monetary investments).
- Or Russia conducts info ops campaigns to destabilize the relationship with Denmark as a part of campaign to destabilize NATO, and weaken the presence in the Arctic.
- How might that alter the dynamics among Arctic nations and between Arctic and non-Arctic states?
- Have Europe and the United States and NATO given adequate thought to the consequences of an independent Greenland, with about fifty thousand citizens sitting astride a strategic strait to the Arctic halfway between Europe and North America?
- **Russia–China strategic alliance**
- Russia establishes a NATO-like relationship with China which also extends to the Arctic, opening up and strengthening Russia–China cooperation (mining, shipping, energy, minerals).

- A much stronger presence of China in the Arctic with a stronger and more direct influence on regional developments (economic, security environmental, etc.).
- What would be the security implications?
- Governance regime?
- Environment and energy exploration?

- **Strange bedfellows – UNCLOS/international laws challenged**

- Either the United States or Canada force a resolution to the Northwest Passage (NWP) sovereignty issue.
- Canada claims the NWP as "internal waters," while the United States and other nations state the maritime channel is an "international strait" as defined under the UNCLOS.
- If the United States or Canada decided to force a resolution to the NWP sovereignty issue, would Russia and China side with Canada?
- Could China use the Canadian NWP precedent to bolster its own claims on control of the South China Sea?
- What would that support for China look like? Would there be pressure (asymmetric response) applied in other parts of the world?

4.3.3 **Asia-Pacific:** LTC Ken Martin provided an Australian perspective of the Asia-Pacific Region.[2]

- **Indo-Pacific or Asia Pacific?**
  - Asia-Pacific is a continental (or geographic) perspective of the region. It focuses on the Asian Land mass and the Islands in the Pacific and their geospatial relationship to each other.
  - Indo-Pacific is a maritime view (or geostrategic) view of the region.
  - Geo-strategically the Indo-Pacific is organized around access to seas, ports and maritime passages. The strategic interests that are at play within the region are global, and therefore any consideration of the Indo-Pacific region must take a global perspective.
  - A geostrategic perspective puts Australia in a 'goldilocks' position: we are too far away to be directly involved/impacted by the increasing power competition in the region, but we are not too far away to be in a position of influence with those major actors.
  - But that is not without challenge - The US is our primary security partner, a nation with which we share strong historical and cultural ties, while China is a primary trading partner and it was their trade that enabled us to weather the GFC relatively better than many of the other western nations.
  - So what is the significance of the Indo-Pacific region?
  - The Indo-Pacific is the most diverse region of the world and over the next three decades it will be central to both world development and global geo-political activity. The Indo-Pacific is the most populous region in the world – over 50% of the world's population lives there. It includes the most populous nation, the largest democratic nation and the largest Muslim majority nation on earth. While only six regional nations are members of the G20, it is a region that is driving global growth. But it also includes many of the world's smallest economies and it is the region that is most susceptible to climate change. It contains nine of the top 10 busiest sea ports with over 50% of world trade passing through the region each year. It is a region of rapid urbanization and currently contains 30 of the world's 47 megacities. It is a heavily militarized region with many of the world's largest standing armies and six nuclear powers. Without doubt, the future of the Indo-Pacific is intrinsically linked to the future of the world.
- **China**
  - Through its size, proximity and activities, China dominates geostrategic thinking within the region.
  - Two key topics are the focus of discussion and consideration about China:
    - Despite its rise (or re-emergence) there remains discussion and speculation on internal challenges and longer term stability: economy structure, internal security challenges, inequality and imbalance within the nation. There are multiple futures – although it is inevitable that the CCP will need to transform in some manner/scale in the coming years.

[2] This overview is based on LTC Ken Martin's own research and does not reflect views of the DCDC or Australian Government.

    - The BRI is a massive infrastructure plan, opening up six economic corridors across the Eurasia landmass and maritime Silk Road. Many perspectives can be taken as to how it serves China:
        - A counter to western containment.
        - A Chinese response to unfavourable world order - a Chinese model of globalization.
        - A strategy to open up new strategic LOCs to bypass strategic maritime chokepoints in SE Asia.
  - For much of the past 2 decades, Australian narrative has sought to encourage a peaceful rise of China - one where it fits in and adopts the norms or a liberal world order. This narrative has been changing over the past 2-3 years.
  - Obviously we are interested in the China-US relationship, there is a spectrum of where and how this may evolve in the future – well documented and discussed in mainstream media and academic circles.
  - It is the implications within the regions that are more relevant to us - the 'ostrich' events.
- **North East Asia**
  - North Korea. Don't want to touch on here – probably the best example where short term events may present significantly alternative futures for the broader region.
  - Normalisation of Japan's constitution.
    - Increasing actor, opening defence industry and defence R&D network may have an impact across the broader Indo-Pacific?
  - Cooperation between China, Japan, South Korea?
    - Unlikely given deep historical animosity between nations, however, such a pact or economic/peace bloc between these nations may push US influence out of the region and have a significant impact on the Pacific balance of power.
- **South Asia**
  - Don't underestimate the impact of India on world order.
    - A Youthful 1.65 Bn people by 2050.
    - Most populous nation by around 2030.
    - Some challenges in predicting economy trajectory - potentially 2nd largest by 2050. Regardless, they will increasingly be seeking to challenge China on an economic basis.
    - They are highly suspicious of China's BRI - see as a form of containment - will see more action from India to maintain their influence and the primary power in South Asia.
  - India - Pakistan - China nexus will remain a challenge and flash point.
    - Based on historical trends, likely see another war between India and Pakistan (both nuclear powers).
    - India and China share a contested border - simmering but potential to flare up - especially with CPEC.
  - Across the sub-region there is a high population living in low elevation coastal zones which will be subject to rising sea levels and extreme weather events - likely that there will be large scale natural disasters experienced in next 30 years.
- **South East Asia**
  - The region of greatest diversity in Asia - economically, politically. Advanced city states and very poor agrarian nations.
    - But has been a highly stable and successful region for the past 50 years, despite a lot of criticism of the 'ASEAN way' of regional governance.
  - A region that has benefited significantly from US presence since the end of WW2 - as US attention is increasingly focused on North Asia, some doubt over extended deterrence.
    - Will this create conditions that may lead to a sub-regional arms race - nations acting unilaterally to secure interests?
  - Indonesia will be the 4th largest world economy by 2050 - how will it wield its power?
    - Currently constrained by many internal challenges, but it has a vision to deal with these. How will it choose to apply its increasing power within SE Asia and the broader region over the coming decades?

- Vietnam fast growing economy - PWC predict a move up the size of economy scale by 12 places to 20th, Philippines up 9 to 19th.
- There is a changing dynamic within the region - an increasing level of inequity between the nations. Will this be a de-stabilizing factor or will it be a spur for increased intra-regional cooperation?
- Some concerns of increasing nationalism within sub-regions' countries with extreme views. Appears that these are being fuelled by social media and increased connectivity. Concern over potential for a movement to increasingly authoritarian governments in several of the regions' countries.
- Climate change will have a significant impact in the region.
  - Changing rain patterns, reduced melt water from Himalayas, salt water intrusion from rising sea levels - Vietnam likely moving from a net rice exporter to rice importer.
  - Potential for collapse of fisheries (primarily due to poor management and over fishing but also climate change related).
  - Potential increased severity of natural disasters - concern over intraregional resilience.

- **Oceania**
  - Biggest risk in Oceania is climate change – global van-guard.
  - Some countries will have relocated by 2050 - how can they manage their EEZ when they don't have a physical presence? Social and society changes will require international efforts to manage and support.
  - Perpetual stage of recovery from natural disasters – with increasing frequency, they are not completing recovery and reconstruction before the next disaster hits.
  - Increasing concern of China's soft power influence in the sub-region - providing financial inducements and unconditional loans to gain influence - undermining AUS and NZ developmental programmes.
- **Summary**
  - China dominates the region - hard to look past its rise and its competition with the US.
  - But it is not all about China. It is the broader, secondary implications that we need to look at. These are the issues that we are at a greater risk of being surprised by (pink flamingo events).

Baseline:

Focus on the People's Republic of China (PRC)

- PRC is further pursuing their "One China Policy". Therefore Taiwan is continuing to model their defence with the help and influence of the US.
- PRC is continuing to focus on blue water Navy and the further development of its A2AD capabilities. There is less attention on expanding their amphibious capabilities, reducing the PLAs (People's Liberation Army) capability of actually invading Taiwan.
- The fortification of the South China Sea is a "done deal", thus allowing the PRC to project their power and influence further.
- The rate of development is rapidly increasing in PRC facilitating the ongoing and future modernization of the PLA in all branches.
- The question of who is the Philippines courting is of upmost importance in the region.
- The maritime domain around Indonesia will be contested by China. As a result China may want Indonesia disorganized and will expand its "string of pearls" port investment. As a consequence Indonesia is chasing a blue water navy.

Focus on South Korea (ROK)

- Possible nuclear proliferation in ROK in response to North Korea acquisition.
- PRC wants a status quo on the Korean peninsula to maintain a buffer. Maintaining this buffer is going to happen solely through political means.
- The frictions between ROK and Japan are likely to continue, especially in the 'East China Sea'.
- North Korea will still need a lifeline to PRC, but may test its room to manoeuvre politically.
- Unique sources of foreign capital for North Korea (from ransomware to nukes)
- "The Art of the Deal" with Trump and North Korea might be possible.

- ROK is continuing to experience a fluctuation between a liberal (promoting a unification w. North Korea) and a conservative (against a unification w. North Korea) leadership. ROK military is hard-line against a unification.
- It is assumed that North Korea will eventually implode because of economic and social tensions.

Key Takeaways – projections out to 2040:

- The Korean peninsula might be used as testing ground for a nuclear option, despite its mountainous landscape limiting the effect of nuclear weapons.
- There will be an ongoing friction between regional competitors (Vietnam, Indonesia, Philippines, etc.) and PRC in the South China Sea.
- US will continue to act as a stabilizing factor in the region. In this regard the essential question will be if the US can handle "2 front" forces and offset PRC in Asia-Pacific and Russia in Europe.
- If US rotates its focus to Asia-Pacific region, can and will NATO adapt and fill the gap in Europe?
- PRC's fragile economy heavily relies on importing raw materials, especially oil. PRC must continue their economic rise to employ their citizens and avoid uprisings.
- PRC as a collective society will continue to gain power through means other than the use of weapons (economics/ funding "Confucian" societies in foreign learning area/ exerting pressure by lobbying).

Implications:

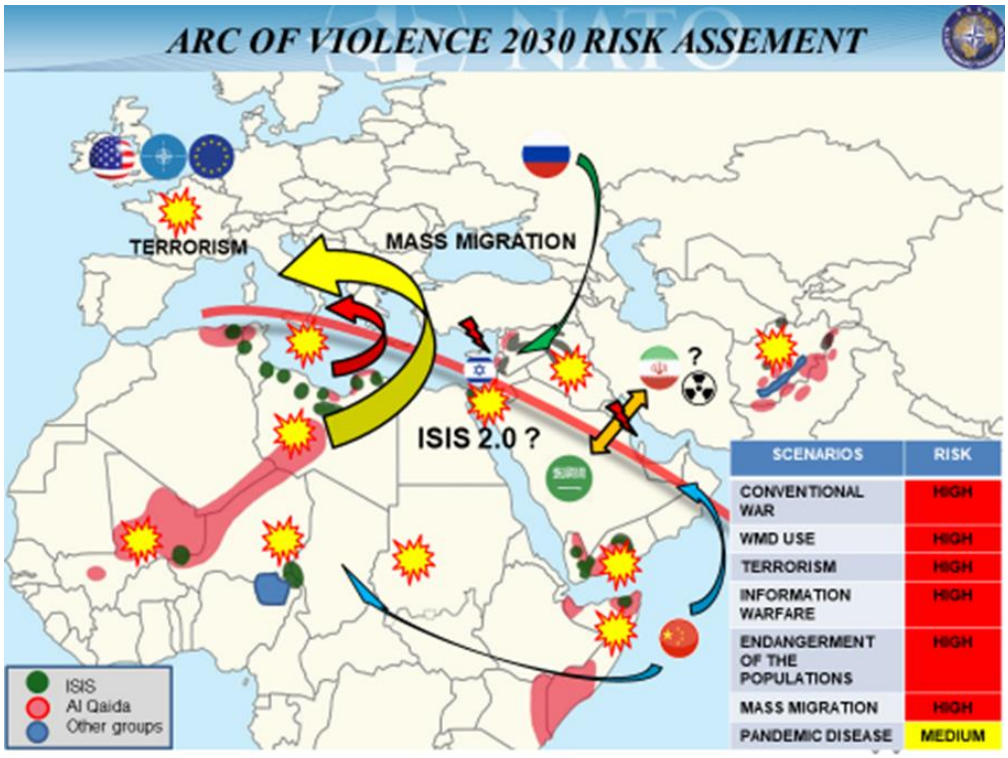
- The Japanese Self Defense Force might change to an offensive force (including nuclear capabilities) to offset PRC and ROK.
- Regional competing nations will continue to obtain arms (A2AD-anti ship missiles) as a cost effective offset to PRC and to protect their territorial waters and their exclusive economic zone.

Asia-Pacific scenarios:

- A non-kinetic globally shaping China.
- Global Naval China where USA is 2nd and pushed back behind the second island chain.
- North Korea implodes and causes mass migration and serious turmoil in the region.
- North Korea implodes and a Korean confederation, as 12th largest economy, is established.
- Indonesian Islamic presence –nationalism – change of Indonesian leadership (ISIS) – cultural clash – Malacca straits.
- A Russian internal turmoil creates issue in Kurile Islands with Japan.
- China solid backing of Pakistan to offset India in the Indo-Pacific region.
- An internal PRC fracture caused by the Chinese rising middle class (Tiananmen 2.0?) causes turmoil in China and impacts PRC ability to influence ROK.
- RC influence projection into space.

4.3.4 **The Middle East and North Africa:** LTC Pierre Asencio (ACT/SPP/SA) gave an overview of the MENA issues.

- LTC Asencio argued that ten years ago the Middle East and North Africa area (MENA) was considered as an arc of crisis. Today, it is an arc of complex violence, unstable and unpredictable. For this reason it is quite impossible to develop a credible view of the situation beyond a horizon of 10 years. For the next decade the MENA will be the principal geopolitical challenge for NATO and European Union (EU) countries who struggle to develop a consistent strategy to address the numerous issues of the area. The main challenge to stabilize the region is to find a new way to be successful in the MENA states political, social and economic transformation process.



Baseline:

Middle East and North Africa: A world in crisis since 1967.
In less than 10 years:

- Arab Springs: Tunisia, Jordan, Egypt, Yemen, Libya, Bahrain, Morocco, Syria;
- War and civil war: Libya, Syria, Yemen, Iraq, Sahel;
- End of Dictatorship: Ben Ali, Kaddafi, Mubarak;
- ISIS and the Caliphate: From Sahel to Afghanistan;
- Crisis: Shia leadership (Iran) versus Sunni leadership (Saudi Arabia); Iran's nuclear programme;
- Mass Migration: A driver of polarization.

- Civil societies will remain traumatized over several generations.

Key Takeaways – projections out to 2030:
General trends 2030:

- HUMAN: Demographic transition not established yet.
  - 500+ millions = European Union: Fertility rate >3.6, population +2% a year; (Sahel not included);
    - MENA and Sahel strip are interconnected in the mass migration issue.
  - Problems in underdeveloped megacities;
  - Two demographic bombs: Gaza Strip and Nile valley.
- ECONOMY: A shift towards Asia.
  - Scarcity of resources: Water, arable lands;
  - Oil economy impacted by USA energy autonomy and EU energy transition;
  - Neo-liberalism, from a rentier model to a production model;
  - Lower standard of living;
  - Increase of criminal economy linked with mass migration.
    - Economic viability might be key to best-case scenario for the region;
- SOCIETAL: Urbanization, friction and instability.

- Urbanization will have an effect on cultural mindset (patriarchal model challenged);
- Secularization of Islam (in a conservative or in modern way) will result in counter action of radical Islam;
- There is a difference between conservative and radical Islam;
- Elements of gender equality will be fundamental in the process of secularization;
- Friction and instability of political models: ''State of right'' versus ''Political Islam".

Political Trends 2030: The new balance of power:

- USA: Progressive disengagement.
  - Shift of strategy: Full Disengagement, Stabilization or Punitive strategy?
  - Aftermath of the vacuum?
- RUSSIA: Restore political power.
  - Reinforce presence in the Mediterranean Sea and Suez Canal area.
- CHINA: Be number one:
  - Deploy to control access to strategic resources.
- EUROPEAN UNION: MENA, the principal geopolitical challenge:
  - Radical Islam and terrorism will continue;
  - Mass Migration and its internal political effect will continue;
  - EU and NATO Cohesion will be challenged by the aftermaths.
- GULF AREA: The moment of truth, Shia versus Sunni influence.
  - Iran will increase its influence from the Mediterranean Sea to the Gulf;
  - Iran's nuclear programme, what next in 2025?
  - Saudi Arabia will try to reinforce its influence as a leader in the area;
  - Saudi/UAE-Qatar conflict is challenging as well; potentially as important as Saudi-Iran competition in the region.
- LEVANT: Bankrupt states, persistence of grey zone;
  - An area of competition between regional leaderships;
  - The role of Turkey (as NATO member) in regional changes will be a critical element;
  - Political manipulation of Islam will continue;
  - ISIS 2.0? The war against terrorism is not over.
- ISRAELI-PALESTINIAN ISSUE.
  - Situation blocked, but Israel and Palestine more and more overlapped;
  - Israel could stand alone.
- MAGHREB:
  - Will try to strengthen the links with Europe.

MENA scenarios: In the framework of the workshop (2 hours) it was impossible to develop credible scenarios for an area so complex. However we can see some important factors to take in consideration in the goal to develop a long term stabilization strategy for the region:

- Migration is "under control" The ultimate challenge for NATO and EU.
  - But best scenario for whom?
    - Best scenario for Europe may not be the best scenario for resource-poor North Africa and potential migrant population.
- Make MENA states stable and self-sustaining.
  - Need of a comprehensive economic strategy, but who in support and in which framework?
  - Be with them but they have to take charge of their own destiny.
- Adapt our strategy.
  - MENA societies are very different—wholesale forced adoption of NATO/Western strategy almost always fails.
    - Cooperation with local cultures and governments may require a change in mind-set on our part;
    - Implementing a political/economic/etc. framework in a society that views it as fundamentally alien will likely fail.
- Win the battle of the narratives.

- Can we manage with fear, or do we need to eliminate it to be successful?
  - Goal of terrorism is to create fear;
  - Muslim vs Christian fear, avoid the clash of civilization;
  - Fear is a business model of terrorists, and at the same time is a business for the media to:
    - Install stories and narratives of hope;
    - Not by naming all the facts, but by naming the emotions those facts create;
    - "Controlling the narrative" is fundamental to win;
    - Arab Spring demonstrated social media's power to distribute information (good and bad).
  - That which we need to fight is not troops, it's an idea.
    - Like Cold War, we fought Communism…this may be similar we need to fight an ideology.
  - Newer type of terrorism: "ghost terrorism".
    - Pushing franchised terrorism onto the dark net;
    - Much more difficult to monitor / track / prevent.
- Secularization of religion will probably help.
  - Provides different level of stability within society;
  - NATO cannot "implement" or "foster," must be home-grown;
  - The idea may not come from the MENA;
  - Secularization of Government may be a more appropriate idea than Secularization of Islam.
    - Secularization of government allows moderate political stances and cooperation / relationships across religious / ethnic lines.

5. Conclusions and the Way-ahead:

The SFA Cadiz Workshop provided an open and transparent environment that allowed extremely useful discussions on the convergence of the technology trends and their implications on all other trends in the political, human, economy/resources and environment domains. Industry representatives provided briefings on how computing power could be used to support the research and analysis phases, development of scenarios to validate and inform trend analysis, and identification of implications.

This workshop gave us the opportunity to share our ideas with participants from NATO and Partner Nations, NATO HQ, NATO Commands and Agencies, NATO COEs, EU and EDA, think tanks and academia. Additionally, discussions on Russia-Eastern Europe, the Arctic, Asia-Pacific and the Middle East and North Africa and the Sahel provided further insights on the impacts of regional development on global security context. The outcome of these discussions will set the stage for regional workshops and the development of regional perspectives reports in 2019.

As the rate of advancement increases exponentially, technology continues to be the main driver for change in other domains. In order to understand how technological and regional developments will shape the security environment and provide in depth analysis of global/regional context, the breakout sessions had open and frank discussions on the issues. Therefore, this report should be read as a reflection of the discussions during the workshop and breakout sessions, and should not be perceived as the views of the Alliance or ACT on any particular subject.